

REMARKS

Claims 2 - 15, 25 - 26, 31 and 38 - 44 remain active in this application. Claims 1, 17 - 24, 27 - 29 and 32 - 37 have previously been canceled and claims 16, 30 and 45 have been canceled without prejudice of disclaimer, above. Editorial and non-substantive amendment of claim 4 has been requested. Amendment of claims 10 and 39 has been requested to answer objections currently made by the Examiner. No new matter has been introduced into the application. The evident withdrawal of the previous requirement for restriction and holding of constructive election is noted with appreciation.

The Examiner has objected to claims 10 - 11, 39 - 41 and 45; making specific criticisms of claims 10, 39 and 45 (thus apparently indicating that the remainder of the claims are included in this objection due to dependency). This objection is respectfully traversed as being moot in view of the amendments to claims 10 and 39 requested above and the cancellation of claim 45.

The Examiner's suggestion in regard to claim 39 has been adopted. However, the Examiner's suggestion in regard to claim 10 would be incorrect and possibly contradictory of claim 38 from which claim 10 depends. While it is true that the term "path" was replaced by "pattern" in claim 38, claim 38 (as well as other independent claims) recite application of the powdered blade material to the puddle formed as the laser beam progresses along the path/pattern. Therefore, the term "path" has been replaced by "puddle" as being a more appropriate correction in answer to the Examiner's objection. Accordingly, in view of the above-requested amendments, reconsideration and withdrawal of this objection is respectfully requested.

Claims 2 - 7, 10, 12 - 14, 16, 30, 31 and 38 - 45 have again been rejected under 35 U.S.C. §103 as being unpatentable over Baker in view of Maybon and claims 8, 9, 11, 15, 25 and 26 have again been rejected under 35 U.S.C. §103 as being unpatentable over Baker in view of Maybon and Cox. These grounds of rejection are respectfully traversed for the reasons of record, particularly in the remarks appended to the responses filed June 17, 2005, September 6, 2005 and March 2, 2006, which are hereby fully incorporated by reference and the further remarks provided below.

Initially, it is noted that the statements of these grounds of rejection are substantial repetitions of statements of these rejections as previously made but now including claims previously held withdrawn from consideration. The Examiner includes claim 12 in comments previously made in regard to claim 10 and adds a brief comment in regard to claim 41. However, the Examiner continues to fail to address the explicit language of the claims in the statements of the rejections and attempts to do so in regard to the recitation of "*applying a blade material in the form of a powder to said area of said puddle while continuing said step of heating said die body to form a deposit comprising said blade material extending from said surface*" (claim 38, emphasis added) only in response to previously submitted remarks. Even then, the Examiner's comments do not address this recitation in its entirety since they only assert that the region melted by the laser of Maybon is a "puddle" *but are silent as to where the powdered blade material is applied* (e.g. "to the puddle" as distinct from being applied directly into the laser beam as in Maybon). This distinction, effectively ignored by the Examiner, is of substantial importance in

the invention since the blade material is principally heated by the heat of the puddle of melted base material melted by the laser and thus largely heated *indirectly* by the laser whereas the blade material powder is *directly* heated by the laser in Maybon. Note that Maybon explicitly states that the "energy of the laser beam 28 melts the surface of the plate body 8 ... and melts the brazing alloy powder" and that the "powder therefore impinges *partly melted* on the surface of the plate body" and "the alloy powder is trapped on the surface and melts further during interaction of the laser beam 28 with the plate body" (column 6, lines 16 - 22, emphasis added). It logically follows that the powder has thus been heated to a temperature at or close to the melting point of the blade material by the laser beam when it contacts the surface and thus cannot significantly contribute to the cooling of the puddle. Thus *no significant cooling of the puddle by heat transfer from the puddle to the powered material and the melting thereof is permitted to occur in Maybon*. The heat transfer regimes are thus vastly different between the present invention and Maybon since the transfer of *residual* heat from the puddle to the powder in accordance with the invention cools and contributes to the re-solidification of the puddle whereas no similar heat transfer mechanism is present in Maybon.

This difference in heat transfer mechanism also achieves an entirely different metallurgical regime and results in a significant difference in the behaviors of the base and blade materials. The more rapid cooling of the puddle by the melting of the blade material limits intermixing of the materials while in a molten state and results in not only a higher concentration of blade material and lower concentration of base/die material

above the original surface of the die and relatively pure blade material in regions near the working surface of the blade while producing cladding with improved adhesion comparable to a weld but also controls the profile of the cladding bead to form a half-elliptical shape of high regularity in the direction of the laser path which is of near net shape to the final blade shape (probably due to the cladding bead profile being apparently limited by the heat transfer from the molten puddle through the melting applied blade material powder adhered to the puddle surface and melting blade material, thus limiting further deposition of powdered blade material when the cooling of the puddle and deposited blade material reaches and drops below the melting point of the blade material). These meritorious and unexpected effects, which Maybon does not and cannot achieve, are well documented in the record, particularly in the declaration of Dr. C. Rey Hsu filed May 25, 2004.

It is respectfully submitted that the Examiner has thus completely failed to make a *prima facie* demonstration of obviousness of any claim in the application since all independent claims now recite the application of powdered blade material to the puddle whereas the powdered blade material is applied into the laser beam in Maybon in order to be directly heated and partially melted thereby before arrival at the deposition surface with melting completed by the laser beam, causing the surface irregularities in the deposited bead and, consequently, larger required bead size to assure sufficient cross-section to be machined into the final desired blade shape as well as necessarily allowing increased mixing of materials while in the molten state; all of which are advantageously avoided by the simple expedient of applying the powdered blade material to the

melted puddle rather than into the area irradiated by the laser beam such that the laser beam causes melting of the powder rather than the residual heat of the puddle in accordance with the invention.

It should also be noted in this regard that the language of at least claims 38 and 44 recite "heating said die body with a laser to form a puddle of melted die body material *in an area in the surface of said die body along a path* corresponding to said pattern" and "applying a blade material in the form of a powder to said area of said puddle while continuing said step of heating said die body" and thus the area being heated and the area receiving the powdered blade material at any given time in accordance with the invention are not the same whereas, in Maybon, the area receiving the powder must be the same as (or within) the area being heated by the laser in order for the laser to complete the melting of the powder, as Maybon explicitly discloses. Similarly, claim 13 recites "*supplying powdered metal having a composition distinct from said base to said puddle along said predetermined path via a tube moving concurrently with said laser beam* so that said laser beam melts a thin layer of the metal base to form said puddle along said path and also melts the metal powder *being delivered to the base*" (emphasis added) and thus clearly recites that the powdered material is being delivered to the base and the puddle formed therein as distinct from being delivered into the laser beam. Baker and Cox do not mitigate this basic deficiency of Maybon to answer the recitations of the claims and the Examiner does not assert that they do. Moreover, the applied prior art, taken singly or in any combination does not provide evidence of a level of ordinary skill in the art which would support the conclusion of obviousness the Examiner

has asserted for the simple reason that they do not lead to an expectation of success in achieving the meritorious effects of the invention in achieving an improved deposit of near net shape with an improved material concentration profile therein or, for that matter, even indicate recognition of the possibility of achieving such meritorious effects.

Thus, while the Examiner attempts to respond to previously submitted remarks and thus justify failing to address explicit recitations of the claims, even if the response to the remarks were asserted as part of the discussion of the grounds of rejection, the response would still fail to answer the explicit recitations of the claims since the Examiner's comments are, in fact, limited to the assertion that Maybon forms a puddle of molten base material but are silent in regard to the location to which the powdered material is applied. Additionally, it is respectfully pointed out that independent claim 44 as well as dependent claims 39 and 40 also explicitly recite the formation of a "half elliptical deposit" and claims 41 and 42 recite the development of a deposit in a near net shape which the Examiner does not address. Therefore, it is again respectfully submitted that the Examiner continues to fail to make and, in fact, cannot make, based on the prior art currently applied against the claims, a *prima facie* demonstration of the propriety of either ground of rejection which the Examiner has asserted. Accordingly, it is again respectfully submitted that the asserted grounds of rejection are clearly in error and, upon reconsideration, should be withdrawn.

It is also respectfully submitted that the finality of the present office action is premature. It is clearly improper for an action to be made final when no *prima*

facie demonstration of the propriety of the rejections therein has been made. Additionally, since numerous claims including independent claims 38 and 44 were previously withdrawn from consideration, the current, final office action contains the *first rejection thereof* while action was withheld in the previous non-final action and finality of the present office action is respectfully submitted to be premature for that reason, as well. Therefore, the finality of the present action should be withdrawn to permit the above-requested amendments to be entered as a matter of right. Further, in any case, it is respectfully submitted that entry of the above-requested amendments is well-justified. The number of claims has been reduced by the cancellation of claims 16 , 30 and 45 and the remainder of the amendments requested are confined to response to criticisms of substantially formal matters by the Examiner. Therefore, no new issues are raised by the requested amendments but, rather, form is improved and issues have been reduced. Accordingly, entry of the above-requested amendments is believed to be well-justified and entry is respectfully requested.

Since all rejections, objections and requirements contained in the outstanding official action have been fully answered and shown to be in error and/or inapplicable to the present claims, it is respectfully submitted that reconsideration is now in order under the provisions of 37 C.F.R. §1.111(b) and such reconsideration is respectfully requested. Upon reconsideration, it is also respectfully submitted that this application is in condition for allowance and such action is therefore respectfully requested.

If an extension of time is required for this response to be considered as being timely filed, a

conditional petition is hereby made for such extension of time. Please charge any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 50-2041.

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "Marshall M. Curtis".

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